

IN THE CLAIMS

Please amend claim 41 as follows below.

Please add new claims 43-58 as follows below.

The following listing of claims replaces all prior versions, and listings, of claims in the application:

1 1-36. (Cancelled)

1 37. (Previously Presented) A pipelined instruction decoder
2 for a multithread processor, the pipelined instruction decoder
3 comprising:

4 an instruction decode pipeline to decode instructions
5 associated with a plurality of instruction threads,
6 the instruction decode pipeline having a
7 predetermined number of pipe stages;
8 a valid bit pipeline in parallel with the instruction
9 decode pipeline, the valid bit pipeline having the
10 same predetermined number of pipe stages in parallel
11 with the predetermined number of pipe stages of the
12 instruction decode pipeline, the valid bit pipeline
13 to associate a valid indicator at each pipe stage
14 with each instruction being decoded in the
15 instruction decode pipeline; and
16 a thread identification pipeline in parallel with the
17 instruction decode pipeline and the valid bit

18 pipeline, the thread identification pipeline having
19 the same predetermined number of pipe stages in
20 parallel with the predetermined number of pipe
21 stages of the instruction decode pipeline and the
22 valid bit pipeline, the thread identification
23 pipeline to associate a thread identification at
24 each pipe stage with each instruction being decoded
25 in the instruction decode pipeline.

1 38. (Previously Presented) The pipelined instruction
2 decoder of claim 37 further comprising:
3 a pipeline controller coupled to the instruction decode
4 pipeline, the valid bit pipeline, and the thread
5 identification pipeline, the pipeline controller to
6 separately control the clocking of each pipe stage
7 of the instruction decode pipeline, the valid bit
8 pipeline, and the thread identification pipeline.

1 39. (Previously Presented) The pipelined instruction
2 decoder of claim 38 wherein
3 the pipeline controller includes clear logic
4 for each pipe stage, the clear logic to control the
5 invalidation of instructions in each pipe stage of
6 the instruction decode pipeline by setting a valid
7 bit in a respective pipe stage of the valid bit
8 pipeline to indicate an invalid instruction.

1 40. (Previously Presented) The pipelined instruction
2 decoder of claim 38 wherein
3 the pipeline controller includes
4 powerdown logic to analyze the valid indicator
5 of each pipe stage to determine if a next pipe stage
6 is to be powerdowned and to determine if a pipe
7 stage is to be stalled; and
8 clock control logic to determine if respective
9 clock signals to a pipe stage of the instruction
10 decode pipeline, the valid bit pipeline, and the
11 thread identification pipeline are to be stopped to
12 conserve power or preserve data during a stall.

1 41. (Currently Amended) The pipelined instruction decoder of
2 claim [[38]] 40 wherein
3 the powerdown logic of the pipeline controller to analyze
4 the valid bit of each pipestage to determine if any pipestage
5 should be stalled,
6 the powerdown logic including
7 an exclusive-OR (XOR) gate to exclusively OR a
8 thread identification of a next to last pipe stage
9 with a thread identification of a stall to
10 determined if they match, and
11 a first AND gate to AND a valid bit of the next
12 to last pipe stage with an output of the XOR gate,

13 in order to determine if a pipe stage prior to
14 the next to last pipe stage should be stalled.

1 42. (Previously Presented) The pipelined instruction
2 decoder of claim 41 wherein
3 the powerdown logic further including,
4 a second AND gate to AND the valid indicator of
5 the pipe stage for which the determination is being
6 made with the valid indicator of the next pipe
7 stage, and
8 a third AND gate to AND an output of the second
9 AND gate with an output from the first AND gate,
10 in order to determine if a pipe stage other
11 than the next to last pipe stage should be stalled.

1 43. (New) The pipelined instruction decoder of claim 38,
2 wherein
3 the pipeline controller to squeeze out bubbles of invalid
4 instructions in the instruction decode pipeline by
5 continuously clocking a pipestage with an invalid instruction
6 until a valid instruction is received and overwrites the
7 invalid instruction.

1 44. (New) The pipelined instruction decoder of claim 38,
2 wherein

3 the pipeline controller to conserve power by stopping the
4 clocking of the pipelined instruction decoder if there is no
5 valid instruction within the pipelined instruction decoder.

1 45. (New) The pipelined instruction decoder of claim 38,
2 wherein

3 the pipeline controller to conserve power by stopping the
4 clocking of circuitry in a pipestage if the thread
5 identification associated with the pipestage indicates a
6 cleared thread of instructions.

1 46. (New) The pipelined instruction decoder of claim 38,
2 wherein

3 the pipeline controller includes
4 powerdown logic to conserve power.

1 47. (New) The pipelined instruction decoder of claim 38,
2 wherein

3 the pipeline controller to invalidate an entire
4 thread of instructions in the instruction decode
5 pipeline associated with a thread identification in
6 response to a clear signal.

1 48. (New) The pipelined instruction decoder of claim 39,
2 wherein

3 the clear logic for each pipe stage of the
4 pipeline controller is responsive to a clear signal
5 to invalidate an entire thread of instructions in
6 the instruction decode pipeline associated with a
7 thread identification.

1 49. (New) An apparatus comprising:
2 an instruction decode pipeline to decode instructions
3 associated with a plurality of instruction threads,
4 the instruction decode pipeline having a
5 predetermined number of pipe stages;
6 a valid bit pipeline in parallel with the instruction
7 decode pipeline, the valid bit pipeline having the
8 same predetermined number of pipe stages in parallel
9 with the predetermined number of pipe stages of the
10 instruction decode pipeline, the valid bit pipeline
11 to associate a valid indicator at each pipe stage
12 with each instruction being decoded in the
13 instruction decode pipeline; and
14 a thread identification pipeline in parallel with the
15 instruction decode pipeline and the valid bit
16 pipeline, the thread identification pipeline having
17 the same predetermined number of pipe stages in
18 parallel with the predetermined number of pipe
19 stages of the instruction decode pipeline and the
20 valid bit pipeline, the thread identification
21 pipeline to associate a thread identification at

22 each pipe stage with each instruction being decoded
23 in the instruction decode pipeline; and
24 a pipeline controller coupled to the instruction decode
25 pipeline, the valid bit pipeline, and the thread
26 identification pipeline, the pipeline controller to
27 squeeze out bubbles of invalid instructions in the
28 instruction decode pipeline by continuously clocking
29 a pipestage with an invalid instruction until a
30 valid instruction is received and overwrites the
31 invalid instruction.

1 50. (New) The apparatus of claim 49, wherein
2 the pipeline controller to conserve power by stopping the
3 clocking of each of the instruction decode pipeline, the valid
4 bit pipeline, and the thread identification pipeline if there
5 is no valid instruction within the instruction decode
6 pipeline.

1 51. (New) The apparatus of claim 49, wherein
2 the pipeline controller to conserve power by stopping the
3 clocking of circuitry in a pipestage if the thread
4 identification associated with the pipestage indicates a
5 cleared thread of instructions.

1 52. (New) The apparatus of claim 49, wherein

2 the pipeline controller to invalidate an entire thread of
3 instructions in the instruction decode pipeline associated
4 with a thread identification in response to a clear signal.

1 53. (New) A system comprising:
2 a memory; and
3 a microprocessor coupled to the memory, the
4 microprocessor having an instruction decoder, the
5 instruction decoder including
6 an instruction decode pipeline to decode
7 instructions associated with a plurality of
8 instruction threads, the instruction decode
9 pipeline having a predetermined number of pipe
10 stages;
11 a valid bit pipeline in parallel with the
12 instruction decode pipeline, the valid bit
13 pipeline having the same predetermined number
14 of pipe stages in parallel with the
15 predetermined number of pipe stages of the
16 instruction decode pipeline, the valid bit
17 pipeline to associate a valid indicator at each
18 pipe stage with each instruction being decoded
19 in the instruction decode pipeline; and
20 a thread identification pipeline in
21 parallel with the instruction decode pipeline
22 and the valid bit pipeline, the thread
23 identification pipeline having the same

24 predetermined number of pipe stages in parallel
25 with the predetermined number of pipe stages of
26 the instruction decode pipeline and the valid
27 bit pipeline, the thread identification
28 pipeline to associate a thread identification
29 at each pipe stage with each instruction being
30 decoded in the instruction decode pipeline.

1 54. (New) The system of claim 53, wherein
2 the instruction decoder further includes
3 a pipeline controller coupled to the
4 instruction decode pipeline, the valid bit pipeline,
5 and the thread identification pipeline, the pipeline
6 controller to control the clocking of each pipe
7 stage of the instruction decode pipeline, the valid
8 bit pipeline, and the thread identification
9 pipeline.

1 55. (New) The system of claim 54, wherein
2 the pipeline controller to squeeze out bubbles
3 of invalid instructions in the instruction decode
4 pipeline by continuously clocking a pipestage with
5 an invalid instruction until a valid instruction is
6 received and overwrites the invalid instruction.

